

US-PAT-NO: 6504571

DOCUMENT-IDENTIFIER: US 6504571 B1

TITLE: System and methods for querying digital
image archives
using recorded parameters

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Brief Summary Text - BSTX (12):

Further, U.S. Pat. No. 5,596,494 to S. Kuo, entitled:
"Method and
Apparatus for Acquiring Digital Maps", discloses a method
and apparatus for
acquiring spatial imagery of terrestrial scenes and deriving
the geophysical
coordinates (latitude and longitude) of ground objects. This
is accomplished
with a computer-controlled camera which captures the
images and records
geophysical data via a GPS receiver. Various parameters
such as roll, pitch,
and drift angles of the camera frame are recorded with each
image to correct
for geometric distortion. The images along with the
geophysical information is
stored in a recording medium. Using this recorded data, it is
possible to

retrieve the latitude and longitude of any ground object. Likewise, Kuo does not teach recording the plurality of parameters discussed above (since it pertains solely to latitude and longitude) or an elaborate query system using the recorded parameters.

Detailed Description Text - DETX (5):

In addition, a flux gate magnetometer (FGM) 130 of any conventional type is operatively connected to the CPU 102 for measuring the orientation of the principal axis of the camera 100 (in 3 dimensions). For instance, the FGM 130 provides an "image mode" parameter to indicate whether the camera 100 is in a portrait mode (vertical dimension is larger) or landscape mode (horizontal dimension is larger) mode. Alternatively, the camera 100 may include either a conventional gyroscope or compass (not shown) in lieu of the FGM 130 for determining the orientation of the camera 100. Also included is a GPS receiver 114, operatively connected between an RF port 116 (e.g., an antenna) and the CPU 102, for recording the geographic position (e.g., latitude, longitude, and altitude) of the camera 100, as well as Universal Time Coordinated (UTC) time

and date and local time and date when an image is taken. It is to be appreciated that additional data such as such as the fix quality (i.e., the ability of the receiver to pick up satellite signals) and the number of satellites in view may be obtained and recorded via the GPS receiver 114. Such information may be used, e.g., to determine if the image was taken indoors or under trees or on a cloudy day. An accelerometer 132 is provided for computing the displacement of the camera 100 from its last determined position when satellite coverage is poor or while the camera 100 is indoors (i.e., the GPS signal is weak or undetectable) so that the position of the camera 100 may be accurately recorded.

Detailed Description Text - DETX (14):

The camera 100 may further include a watermarker processor 134, for watermarking the recorded parameters within each image in accordance with the methods disclosed in U.S. patent application Ser. No. 09/080,517, entitled "An Image Capturing System and Method For Automatically Watermarking Recorded Parameters For Providing Digital Image Verification", the disclosure of which

is fully incorporated by reference. As discussed in the above-incorporated reference, the watermarking method allows the recorded parameters to be watermarked into every captured image, which parameters may then be later extracted and compared with the originally recorded parameters for verifying the authenticity of pictures, as well as for indexing and searching photo albums. Since the parameters are watermarked into the image, it is difficult to modify the image without affecting the watermarked data.